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Innovations in Parking Management

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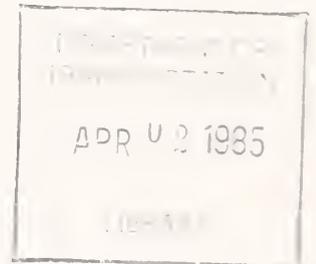
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Innovations in Parking Management

Final Report
January 1982

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PREFACE

Parking management practices have been the subject of several major research efforts in recent years. A national survey of parking management programs was carried out in 1977 by the Virginia Highway and Transportation Research Board,¹ and a major national study of parking programs was conducted for the Federal Highway Administration by Peat, Marwick, Mitchell and Company.²

Building up the information provided by these earlier studies, the Urban Mass Transportation Administration's Office of Policy, Budget, and Program Development sponsored the preparation of a report for local government decision makers describing the key characteristics of some of the more recent and innovative parking management strategies.

Local government officials have recognized the importance and complexity of parking management and have expressed a strong interest in the subject. In fact, the Urban Consortium's Transportation Task Force, which is made up of senior transportation officials from the nation's largest cities and urban counties, has identified parking management as one of its priority concerns. The Task Force previously had prepared an Information Bulletin on the subject.³

This report is based upon site visits and written communication with transportation officials in more than 100 cities throughout the country. Traditional parking management practices, such as curbside restrictions, are not discussed. Rather, the report describes a number of relatively new and innovative ways by which cities and counties are attempting to address the issues of how much parking to provide, who should have access to it, and at what cost.

We would like to thank the many local officials, too numerous to mention, without whose support and cooperation this project could not have been undertaken.

¹ Parker, Martin R., and Michael J. Demetsky. *Evaluation of Parking Management Strategies for Urban Areas*. Charlottesville, Virginia: Highway & Transportation Research Council, 1980.

² Federal Highway Administration. *Study of Parking Management Tactics*, FHWA-PL-79-021. Washington, D.C. GPO, 1979.

³ Public Technology, Inc. *Parking Management*. Washington, D.C. GPO, 1978.

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OVERVIEW

Parking management is the comprehensive and effective management of the quantity, location, cost, and availability of parking in a jurisdiction. It is a policy issue that has been receiving an increasing amount of attention recently for a number of reasons including the desire to conserve energy and reduce automobile congestion, the need to generate additional revenue for financially hard-pressed cities, the requirement to improve air quality, and the desire, in certain instances, to give preferential treatment to various user groups, such as shoppers, carpoolers, or neighborhood residents.

The term parking management first received widespread attention in the early 1970's when the Environmental Protection Agency (EPA) proposed the development of transportation control plans (TCP) for a number of major metropolitan areas that did not meet Federal air quality standards. At the time, the TCP's were extremely controversial—provisions set forth in some of the plans would have sharply curtailed certain kinds of private automobile travel—and, as a result, Congress indefinitely suspended their implementation. Nonetheless, during the past decade a number of cities have proceeded to implement some of the parking control measures envisioned in the TCP's, frequently for other than environmental reasons.

Managing or controlling parking is hardly a new municipal practice. For years, cities have regulated on-street parking by the use of signs and parking meters. Towing vehicles that are illegally parked during rush hour or that are blocking access to an alley or fire hydrant has been commonplace. Zoning powers have traditionally been used to spell out the amount of

parking that must be provided in conjunction with development projects.

What is new about parking management, however, is a marked change in attitude. Until recently, parking policies were primarily intended to enhance the use of the private automobile. Now a number of jurisdictions are pursuing policies that seek a balance between the often competing claims of private automobile owners, pedestrians, transit users, and neighborhood groups.

Some of the specific programs that are being implemented are also new—for example, residential parking permit programs and booting—and there is a growing recognition that comprehensive and effective management of parking can be a powerful transportation planning tool.

There are a number of reasons why this recognition has been slow to develop. First, parking is a very complex policy issue involving a multitude of actors and organizations. An incomplete list of the latter would include: police department, transportation department, planning department, zoning commission, parking authority, finance department, city attorney's office, transit authority, and an untold number of private sector parking operators.

Second, it has always been an article of faith that, when it comes to parking, more is better. This view is especially deep-seated in the downtown retailing community, which often perceives changes in parking policy as a threat to its very existence.

Third, except in the largest urban centers which have well developed public transit systems, most Americans use their private automobiles for the journey to work,

and any changes in parking policy can provoke intense public reaction.

Notwithstanding the above, the energy crisis, air pollution, auto congestion, and the need to find additional sources of revenue are all conspiring to force jurisdictions to think more systematically about their parking policies. A number of cities have made a conscious decision to limit the growth of their parking supply. Some jurisdictions have embarked upon programs to encourage carpooling and vanpooling while discouraging single occupant vehicle travel. Still others are developing strategies to provide incentives for certain kinds of travel—shoppers' visits and tourists—and disincentives for other kinds of trips, such as all-day commuters.

Parking is clearly a complex and important policy concern. Decisions made about parking affect not only our travel behavior and mode of travel but our land use and development patterns as well. The subject warrants the kind of careful analysis and coordinated decision-making that an increasing number of cities are giving it.

OFF-STREET PARKING SUPPLY CONTROLS

The zoning ordinance can be a particularly powerful tool in determining both the location of parking facilities and the amount of parking to be provided. Historically, zoning ordinances specified the minimum amount of new parking that had to be provided in conjunction with new development. For instance, Baltimore's ordinance, as it applies to the central business district (CBD), requires one parking space per 1,000 square feet of office floor area above the first 50,000 square feet of floor area. Also, one parking space is required for each new residential unit, but there is no minimum parking requirement for retail facilities.

More recently a number of jurisdictions have reversed this policy either to eliminate the minimum requirement for new parking spaces associated with development or to place a ceiling on the number of spaces that can be provided with new developments. Seattle and San Francisco are both examples of cities that have eliminated minimum parking requirements.

In San Francisco, where parking in the downtown may be provided only as an accessory use, the ordinance now limits to seven percent the amount of gross floor area that may be allocated for parking. Any amount of parking proposed above this limit requires conditional use review by the City Planning Commission. San Francisco is also considering additional changes to its zoning ordinances that would establish three downtown parking districts. In the first district, in the heart of the CBD, new parking facilities would be prohibited and existing parking would be converted to short-term use. In the second district, additional short-term facilities would be permitted, and in the third district,

on the periphery of the CBD, long-term commuter parking would be permitted.

Other cities have adopted similar changes in their zoning ordinance, tailored to local conditions. Chicago changed its zoning ordinance to create a Central Area Parking District. Within the District, off-street parking facilities are allowed only as an accessory use. Specific changes reduced the previously required number of parking spaces by 20%. Buildings with a floor area of 140,000 square feet or less require no parking. Buildings with a direct entrance to the underground transit system require 10% fewer parking spaces than the code specifies. These changes were occasioned, among other reasons, by pressure from the Federal government to improve air quality. Since 1975, the supply of parking in the Chicago CBD has decreased by 10% although there has been a marked increase in new office construction in the downtown area.

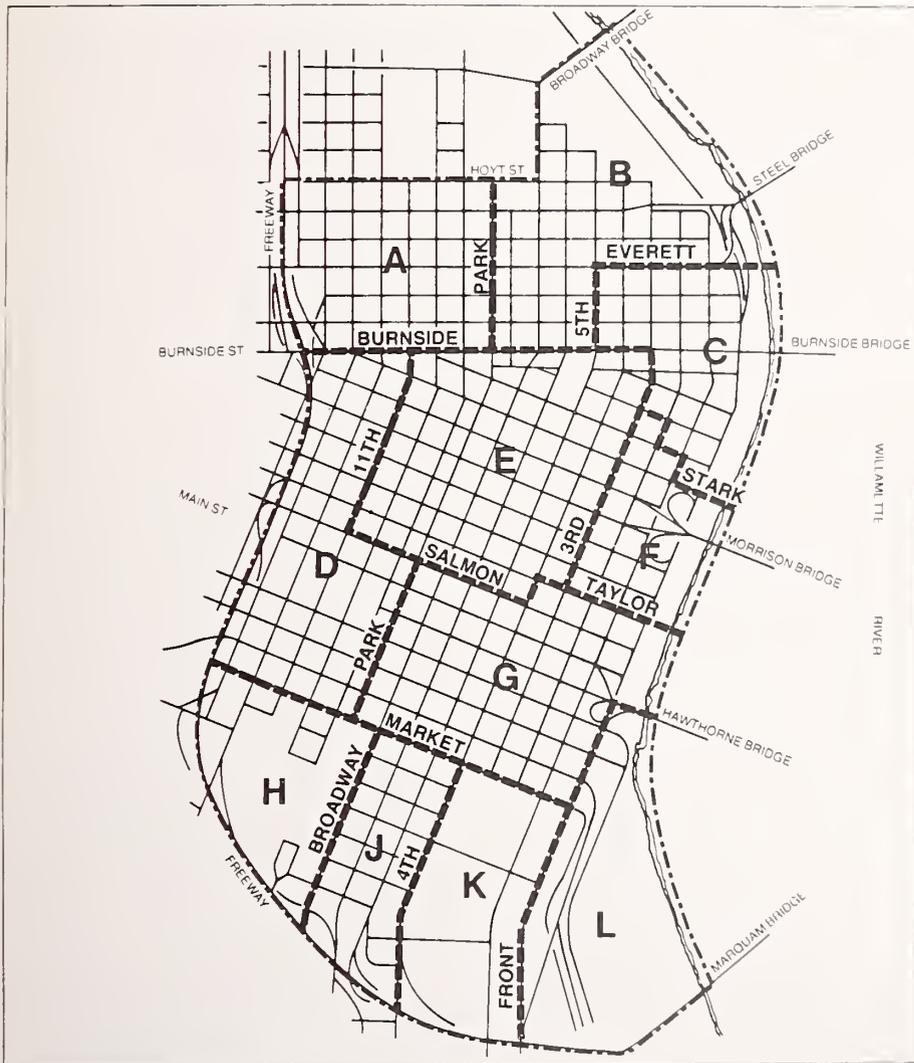
High Point, North Carolina reduced the requirements for off-street parking in sections of the CBD to encourage the use of transit and because of the lack of available land.

Other jurisdictions have moved to control the growth of off-street parking by freezing the maximum number of spaces that can be built or by providing transit incentives to reduce minimum parking requirements. Boston (see box) has placed a ceiling on the total amount of new commercial parking that can be provided in its downtown core. Portland, Oregon has developed a city parking and circulation plan that places a cap on the total parking supply in its CBD. Unlike the Boston program, the ceiling in Portland applies to employee customer parking as well as to commercial spaces.

The Portland plan sets the maximum number of spaces that are permitted in the CBD at 40,055. The number is based upon a 1973 survey of parking spaces that either were in

Sector parking space allocations have been suggested to guide public and private action.

| Parking Sector | Parking Space Allocation | | |
|------------------------|--------------------------|---------------|---------------|
| | Long-Term | Short-Term | Total |
| A | 2,200 | 1,100 | 3,300 |
| B | 2,800 | 1,570 | 4,370 |
| C | 1,000 | 600 | 1,600 |
| D | 1,500 | 1,500 | 3,000 |
| E | 4,000 | 4,500 | 8,500 |
| F | 1,300 | 1,500 | 2,800 |
| G | 4,700 | 2,800 | 7,500 |
| H | 700 | 500 | 1,200 |
| J | 2,100 | 1,700 | 3,800 |
| K | 1,700 | 1,100 | 2,800 |
| L | 870 | 315 | 1,185 |
| Total | 22,870 | 17,185 | 40,055 |



Map showing downtown Portland's 11 parking sectors. The total number of parking spaces may not exceed 40,055.

use or were committed in that year, plus 1,985 spaces added in 1980 when the plan was updated. The CBD is subdivided into eleven sectors and allocations of spaces to the various sectors have been suggested. Development proposals that include parking are reviewed by the City's Planning Bureau to ensure that the requested parking conforms with the overall

goals of the City's parking policy. To date, the program has significantly reduced the amount of parking that is being provided as part of new developments and has channelled new parking into those sectors of the CBD where it is most appropriate.

This study's research identified 20 jurisdictions that have used zoning changes and eight jurisdictions that

have employed growth constraints to affect the supply of parking. The objectives of most of the policies that influence the supply of off-street parking were promoting more productive land uses, stimulating economic growth, and increasing public transportation ridership.

One of the most comprehensive parking management plans has been drawn up by the City of Los Angeles. In the initial stage, seven parking management proposals were identified:

- employee incentive proposal
- city employee incentive proposal
- high occupancy vehicle parking proposal
- park-and-ride parking substitution proposal
- joint use parking proposal
- parking design proposal
- city transportation services proposal

The basic thrust of these proposals is to encourage a voluntary reduction in the supply of off-street parking by developers and businesses in exchange for their commitment to implement measures that will reduce single occupant automobile travel. These measures include promoting the use of carpools, vanpools, conventional transit, and subscription bus service

The proposals are not intended to alter the intent of existing parking requirements but to create alternative ways by which those requirements can be met.

Many of these proposals will require amending the Planning and Zoning Code. For example, the park and ride substitution proposal would permit a developer to substitute remote park and ride spaces in a suburban location for required on-site spaces, provided that high occupancy transportation is provided to connect the remote facilities to the developed site.

It should be pointed out that business opposition to changes in the zoning code and to growth restraints, noted by a number of jurisdictions, is an important obstacle that must be overcome in order to implement these changes in parking policy.

BOSTON: LIMITS ON NEW COMMERCIAL PARKING

At the behest of the Boston Air Pollution Control Commission (BAPCC), the City of Boston has implemented a program that attempts to strike a balance between the goals of improving air quality and maintaining the central business district's commercial viability. The commercial parking freeze, one of the tactics in Boston's parking management policy, places limits on the construction of new off-street parking facilities.

Parking facilities covered by the freeze include all facilities open to the general public for a fee. The freeze does not cover employee parking or free parking. The total number of commercial parking spaces permitted under the freeze is 35,503, which is the number of spaces that existed or were committed in October, 1973.

Developers wishing to build new commercial parking facilities must apply to a parking "bank" containing parking space "credits". When one commercial parking space is physically removed, one credit to build a new space is added to the bank. The interested developer is issued a permit to build new spaces, when the following conditions exist:

- 1) credits are available in the bank.
- 2) the proposed site of the new spaces does not already have an adequate number of parking spaces.
- 3) the new spaces won't exacerbate traffic congestion at peak hours or interfere with pedestrian or vehicular movement on surrounding streets.

4) there is sufficient access to the new spaces from major highways serving the area.

5) the new spaces will directly serve the surrounding area.

6) the overall design of the new spaces is consistent with and esthetically pleasing to the surrounding area.

BAPCC hopes that the banking concept will lead to the distribution of the available parking as needed throughout the city and that inefficient or unused spaces will be eliminated so that new development needs can be met. Since the program was initiated in 1976, the area covered by the freeze has been expanded to include an area west of downtown and Logan Airport in East Boston. Approximately 1,400 parking credits have been added to the bank and more than 1,000 parking permits have been granted to developers.

The Boston Redevelopment Authority and the BAPCC feel that the program could be considerably more effective if the freeze were extended to include both employee-reserved parking and free parking. At present, there is no restriction on the amount of new employer-provided parking or free parking that may be constructed. If these changes were made, the total number of usable spaces that would come under the freeze would increase from 35,503 to 54,452.

PARKING PRICING POLICIES

There are a number of ways by which cities can change their parking rate structure. Most of these, however, will only directly affect publicly-controlled parking spaces. The rate changes can be either general in nature, for instance, a 10¢ per hour increase in the parking rate, or specifically directed at various classes of users. Examples of the latter include differential rates that favor carpools and vanpools or a graduated rate structure that favors short-term parking.

One general pricing change that affects all commercial parking spaces, whether publicly or privately controlled, is the imposition of a citywide tax on parking. Both Washington and San Francisco have imposed such a tax, primarily to generate additional revenue for the city. The tax rates are, respectively, 12% and 15%, and in both cases the increased revenue to the city is in the millions of dollars. Few other cities have imposed or are considering imposing such a tax at this time.

A general increase in parking rates has been far more common. However, cities do not set the parking rates in privately controlled parking facilities and thus this change, unlike the parking tax, only directly affects publicly-controlled spaces. The reasons most frequently cited for overall price increases were inflation, raising additional revenue for the jurisdiction, debt service requirements, and keeping pace with the rates charged by private sector parking operators. Nearly half of the jurisdictions contacted had recently increased the rates in publicly-controlled spaces.

The second category of parking rate changes, those which are specifically directed at certain classes

of users, are not intended primarily to generate revenue but rather to achieve other community objectives, such as discouraging all-day commuter parking and strengthening retail and commercial areas. The latter objective was frequently cited as the rationale for changes in the rate structure that favor short-term parking.

As a general rule, cities report that the area most affected by changes in the price of parking is the central business district. For instance, Chicago raised its rates for downtown parking meters and at eight downtown city garages, primarily to generate additional revenue. Long-term rates went up by more than 50%, while short-term rates increased by less than 50%, so that there would be greater vehicle turnover and more spaces available for short-term parking. Although city revenue did not increase as much as expected, there was a significant drop in all-day commuter parking, and short-term parking did increase slightly despite the higher rates.

Milwaukee also raised its on-street meter rates to encourage turnover. Rate increases from 10¢ to 25¢ an hour resulted in a modest improvement in space availability.

A number of jurisdictions have implemented pricing changes to favor carpools and vanpools in city-controlled spaces. Seattle's rate structure favors both short-term parking and carpools and vanpools as part of the city's overall policy of encouraging high occupancy vehicle travel. Carpools using the on-street metered spaces reserved for their use can save approximately \$35 a month. In Houston, carpools and vanpools are given discounts of 25¢ to 75¢ a day in

several lots operated by the City Center Department.

Madison, Wisconsin is implementing a parking surcharge demonstration program during the morning peak period (7:00 A.M. to 9:30 A.M.) that will increase the cost of all-day parking in two city parking ramps and two parking lots by more than 50%. The principal goal of the surcharge program is to induce commuters who drive alone to switch to transit or carpools, thereby freeing up parking spaces for midday shoppers and visitors. Since the program began, the occupancy level at the facilities where the \$1.00 surcharge is imposed is down significantly during the morning peak period, but by midday the number of occupied spaces is comparable to the pre-demonstration level.

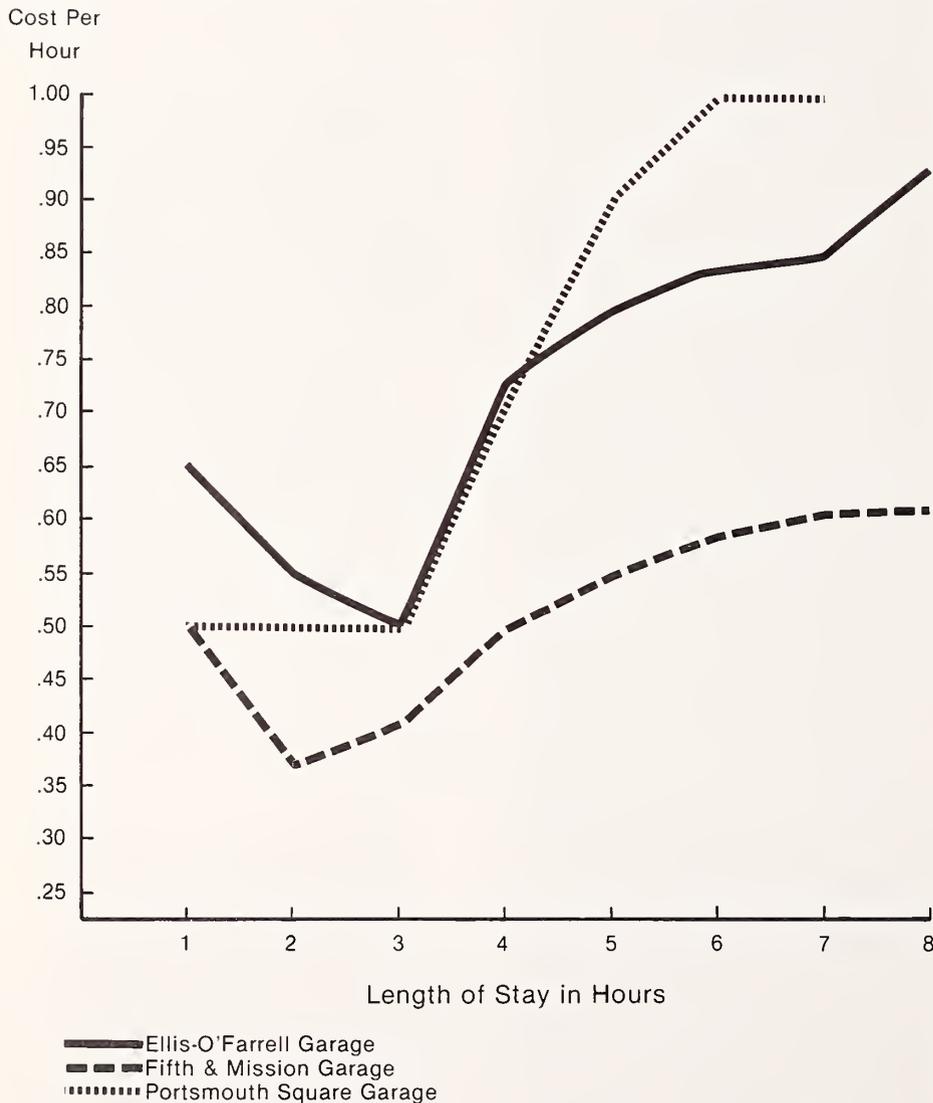
San Francisco's rate structure has been changed to encourage short-term and discourage long-term parking. Monthly parking permits for city parking garages are no longer sold. The following example shows how San Francisco's rate structure is designed to discourage long-term parking:

one hour—30¢
two hours—65¢ (32.5¢ an hour)
six hours—\$3.10 (52¢ an hour)
eight hours—\$4.50 (56.5¢ an hour)

The rates in three large garages with a total of 3,300 spaces are being increased to a new maximum of \$6.50 for any stay over four hours to discourage commuter parking.

One important difference between changes in the parking rate structure and some of the other parking management practices, such as park-and-ride programs, is that rates can be modified fairly easily if unwanted consequences result. For example, if a

San Francisco Parking Authority Rate Schedules—October 1980



city were to increase substantially its short-term parking rates in public facilities within the CBD, several different outcomes are possible: persons could continue to use the facilities and pay the higher rate; they could leave their cars at home and travel to the CBD by a different mode; they could park on the periphery of the CBD and walk to their destinations; or they could stop making discretionary trips to the CBD for shopping and personal business. If discretionary travel to the CBD declined dramatically, the city might decide that the benefits of the rate increase were outweighed by the damage to its business community and, accordingly, roll back the increase.

Hourly rates in three downtown San Francisco city-owned parking garages increase significantly for stays of more than four hours.

OTTAWA AND WASHINGTON: SHOULD FEDERAL EMPLOYEES PAY PREVAILING RATES?

For jurisdictions whose transportation objectives include discouraging single occupant automobile travel, particularly the journey-to-work trip, and encouraging energy conservation, the provision of employer-provided free or below-market-rate parking is a major problem. The problem stems from the fact that free or reduced rate parking distorts the choice of transportation mode by effectively subsidizing those who drive.

Insofar as free parking induces people to drive who might otherwise choose an alternative mode, it contributes to increased air pollution, and in urban areas, to increased traffic congestion.

The Canadian government implemented a new policy in 1975, discontinuing the practice of providing free parking to Federal employees if they worked in cities with adequate public transit systems. The policy set the parking rate for Federal employees at 70% of the prevailing commercial rate.

In a study conducted in Ottawa following implementation of the new policy, the government concluded that the parking policy had a significant effect on the mode choice of Federal employees working in downtown Ottawa. Specifically:

- the number of Federal employees driving to work declined by more than 20%.
- the number of Federal employees using the bus increased by 16%.
- among those who continued to drive, the vehicle occupancy rate increased, as did organized carpooling. When persons who had formerly driven to work were asked why they had changed modes, the most commonly cited reason was the imposition of the parking charge.

Like its Canadian counterpart, the U.S. government used to provide free or inexpensive parking at government facilities. However, on November 1, 1979, Federal agencies were directed by an executive order to charge their employees one-half the commercial parking fee in areas where comparable commercial parking cost \$10 a month or more. In another two years, parking rates were to have been raised again to be comparable to the fees charged by private operators. The executive order was intended to end the subsidy that free or below-market-rate parking represents and to encourage carpooling and the use of public transit for the journey to work.

In 1981, a Federal judge ruled that the government had acted illegally when it began to charge Federal employees for parking spaces because the program had been implemented by executive order, without the required approval of Congress. In light of the strong opposition to the program by groups representing Federal employees, it is unclear whether congressional approval for the program will ever be sought.

PARK-AND-RIDE PROGRAMS

Park-and-ride programs are intended to induce commuters to transfer from their initial mode of access, generally their automobiles, to a transit vehicle or other high occupancy vehicle (carpool, vanpool) for the final leg of their trip, particularly the journey-to-work.

Most park-and-ride facilities are located beyond the CBD so the programs have the effect of moving the parking supply away from the built-up core area of a city to the less densely developed portions of the region. In virtually all park and ride programs, public transit provides service between the parking facility in an outlying area and the CBD.

Park-and-ride programs are in place in many urban areas throughout the country. This study's research identified approximately 50 jurisdictions with ongoing programs. The park-and-ride facilities range from unpaved lots to fenced, paved parking lots with shelters and other amenities for passengers. In some cases, existing facilities are used, such as shopping centers or church parking lots, often without cost to the agency administering the program. Other park and ride lots are operated by local governments or regional transit agencies, with the public agency constructing and operating the parking facilities.

Park-and-ride programs are intended to save energy, reduce air pollution, cut down on congestion both on major arterials and within the CBD, and support public transit. With respect to the latter, park-and-ride programs can have several advantages for transit properties. First, they are a source of new ridership. Second, by having passengers come to the park-and-ride lots, they enable a transit system to provide efficient

service to low density, outlying portions of a metropolitan area. If the service is reliable and comfortable and represents a substantial savings over driving, it can be an attractive alternative for persons travelling to the CBD.

There is enormous variation in the park-and-ride programs both in terms of the number of separate park-and-ride facilities and the number of spaces at those facilities. The research indicated that 30 jurisdictions have 5 or less sites, 15 jurisdictions have between 6 and 20 separate sites in their program, and 5 jurisdictions have more than 20 sites. The number of spaces available at those sites is as follows:

- 250 spaces or less—11 programs
- 250—1,000 spaces—12 programs
- 1,000—1,500 spaces—3 programs
- more than 1,500 spaces—12 programs

Seldom is there a fee for parking at these facilities. Seventy-two percent of the lots are served by express buses, 57% by local buses, 19% by heavy or commuter rail, and 6% by light rail. Two-thirds of the lots are served by transit during both peak and off-peak hours; the remaining one-third of the lots receive only peak hour service.

Deciding the location of park-and-ride lots and acquiring the funds needed to construct new facilities are major issues that must be addressed early in the development of a park-and-ride program. A more difficult problem that a number of jurisdictions have encountered is reaching a mutually satisfactory legal agreement with property owners regarding the use of existing parking facilities.

NEW ORLEANS: PERIPHERAL PARKING

New Orleans' peripheral parking program was conceived of by the City Planning Commission. The idea was subsequently incorporated into the city's transportation plan, one of the goals of which is to dramatically increase by 1985 the percentage of commuters who travel to work via public transit. Peripheral parking with its attendant shuttle service into the CBD is seen as a prime way to achieve this goal.

The program anticipates the development of four new park-and-ride facilities, one of which is the Superdome stadium's immense parking lot, previously unused during the day. The Superdome lot is the first park-and-ride facility to be put in use, with a second lot in Louis Armstrong Park. The location of these two facilities is ideal: the Superdome lot is located near an interstate highway entering the city from the west, and the Louis Armstrong Park lot is located off the interstate entering from the east. The other two lots in the program will possibly be developed as joint use facilities in conjunction with commercial or retail development.

The purpose of the program is to reduce auto congestion both into and within the CBD and to reduce the demand for parking in the downtown. The elements of the program are:

- the 5,000-space parking lot at the Superdome costs only \$1.00 a day (vs. \$3.00-\$4.00 a day in the CBD).
- shuttle bus service operates all day linking the Superdome lot to the CBD.
- shuttle buses operate at seven minute intervals during the peaks; however, because the shuttle system operates on a two-

way loop route, the wait for a bus is usually only 3½ minutes.

- the shuttle bus fare is only 10¢ (vs. 30¢ on regular buses).

The program was initially advertised on radio, television, and on the marquee outside the Superdome. In addition, an insert describing the shuttle route is currently included in the transit map prepared for the regular bus system.

The program has been extremely successful:

- ridership averages 5,000 a day, mostly at peak hours and during lunch hours (the number increases considerably when conventions are in town).
- on an average day, 85% of the 5,000 spaces at the Superdome are occupied.
- the program has shifted approximately 1,200 cars from CBD parking to the Superdome lot thereby freeing CBD spaces for shoppers and visitors.
- although only two quadrants of the Superdome parking lot are readily accessible to the shuttle bus, the convenience and low cost of the system seem to outweigh the fact that parking in the back two quadrants necessitates a substantial walk to the shuttle pick-up point.

Officials of the Downtown Development District, which donates \$100,000 annually to the city's subsidy, are hoping to ensure the continued success of the program by:

- maintaining the 10¢ fare.
- negotiating with the State and the Superdome to underwrite some of the parking costs at the Superdome in exchange for control over the parking rate. The privately managed Superdome

has steadily raised the parking rate in the past. The DDD feels that any large increase in this rate will reduce the program's appeal to commuters.

- using revenues from the Louis Armstrong Park parking lot when it is in use to help support the shuttle service between the lot and the CBD.
- using route modifications to increase the efficiency of the system.

Because the present system requires a \$500,000 annual subsidy, the continued success of the program and the plans for expansion depend upon the City's ability to continue to fund the shuttle bus service.

CARPOOL/VANPOOL PREFERENTIAL PARKING PROGRAMS

Preferential parking programs for carpools and vanpools (CVPP) have been instituted by both public agencies and private employers in response to a variety of objectives. From the national perspective, the programs encourage ridesharing, which is a key element of any national energy conservation program. At the local level, the preferential parking programs serve to promote the use of high occupancy vehicles, which translates into less air pollution and reduced traffic congestion, particularly within the central business district. For individuals, the preferential parking afforded carpools and vanpools is more convenient and generally enables them to save on transportation costs.

In time, these programs also may lead to changes in land use if the overall number of parking spaces provided for a particular business or activity center, and the amount of land devoted to parking, can be reduced. In the short run, however, CVPP programs, like residential permit parking programs, do not alter the supply of parking but simply restrict access to that which already exists.

This study's research identified 17 jurisdictions that have ongoing CVPP programs with an additional 9 jurisdictions scheduled to implement such a program. In a number of other jurisdictions which do not have a municipally-sponsored CVPP program, private employers have initiated programs to provide preferential parking for carpools and/or vanpools in their company-owned or controlled lots.

The most frequently cited objectives of the program among the jurisdictions that have CVPP programs in effect were reducing the demand for parking, reducing traffic congestion, and conserving gasoline.

A few CVPP programs, such as those in Portland, Oregon (see box) and Seattle, involve designating on-street spaces for carpools and vanpools. However, most of the programs set aside off-street spaces for exclusive use by high occupancy vehicles. For example, in Baltimore, municipal parking lots were constructed beneath an elevated portion of Interstate 83 on the eastern edge of the CBD with the majority of the spaces in these metered lots (301 spaces) designated for carpools and vanpools.

The operating characteristics of the CVPP programs vary considerably from one jurisdiction to another. In Seattle, 164 metered on-street spaces are reserved for carpool parking only between 7:00 A.M. and 9:00 A.M. The City issues permits for \$5 a month to certified three-person car-

pools wishing to park at one of the designated spaces. After 9:00 A.M., any of the 164 spaces that are not occupied by carpool vehicles can be used by any vehicle, with the latter paying normal meter rates. Conversely, in Baltimore, the carpools are issued a free carpool permit by the City to park in off-street metered spaces that are reserved for carpools, but they must pay the regular meter rate of \$2 for eight hours.

A number of cities have instituted CVPP programs specifically directed at government employees. In Indianapolis, 200 off-street spaces at two sites are set aside for four-person carpools. The CVPP permit is good for one year and is free. Building guards police the program. In Prince George's County, Maryland, 115 spaces at three sites under the direct control of the county government are



Baltimore has developed municipal parking facilities beneath an elevated portion of Interstate 83. Most of the spaces are reserved on weekdays for carpool permit holders only between 6:00 and 10:00 A.M.



Metered spaces in Seattle reserved for carpool parking.

reserved for carpools and vanpools. Greensboro, North Carolina has set aside 150 spaces at three sites for city employees who carpool.

The State government in Florida has implemented a preferential parking program for State employees in Tallahassee. Santa Cruz, California has reserved approximately 50 spaces in its City Hall parking lot for free use by carpools, and Wichita will soon implement a similar program.

To encourage the formation of carpools by city employees, San Antonio designated one 200-space lot used by city employees for exclusive use by carpools and vanpools. The carpools (two or more persons) purchase a permit for \$6 a month. If the city employees who previously used the lot did not form carpools, they could no longer use the lot. The pro-

gram has resulted in the formation of about 100 new carpools involving 250 employees. Phoenix has an informal voluntary carpooling program for city employees with the vehicles given preferred free parking as an inducement. This program covers three sites with 172 spaces. Carpools must include three or more persons and the CVPP program is monitored by lot attendants. The program has been moderately successful.

To increase the use of special lanes reserved for carpools on two major arterials, Miami/Dade County has designated eight sites with a total of 659 off-street spaces for use by carpools. Attendants at the lot entrances ensure that the spaces are used only by carpools of at least two persons.

The cost is 50¢ a day per vehicle; there are no in-and-out privileges.

A cautionary note regarding implementation of a CVPP program: compliance has been a major problem in some jurisdictions where there is no monitoring by attendants of the CVPP lots or parking spaces. For example, the Baltimore program requires that a driver attest to the fact that he represents a three-person carpool as a precondition to receiving the necessary carpool permit.

However, there is no way to ensure that the vehicles with permits that are parked in the designated spaces actually carried three or more persons. City officials are concerned about the possible abuse of the program.

PORTLAND: DOWNTOWN CARPOOL PERMIT PARKING

Portland, Oregon (population 350,000) began its downtown carpool preferential parking program in late 1977. The program is a cooperative effort between the City and the regional ridesharing project and is intended to provide an additional incentive to form carpools of three or more persons.

A monthly carpool permit may be purchased for \$15. Vehicles displaying this permit can park at any of the City's 2,615 six-hour parking meters on an unlimited basis, without paying the hourly fee. Prior to issuance of the permit, each member of the carpool must submit an application form. Subsequently, a contact person in each carpool is responsible for

renewing the permit either by mail or in person. Ridesharing project staff members verify approximately 10% of all new applications and renewal requests each month.

The number of permits issued and persons participating increased steadily during the first year of the program from 105 carpools carrying 360 people to 280 carpools carrying slightly fewer than 1,000 people. The program has levelled off at the latter figures primarily because the more desirable six-hour meter locations are taken early in the morning and most of the remaining six-hour meters are located on the periphery of the CBD, away from the principal activity centers.

city, thus, does not imply that every neighborhood in that city is included in the program.

While there is no universally-employed procedure for implementing an RPP program, the request for designation typically originates a traffic survey as a precondition to designation. If a high percentage of the available on-street spaces are determined to be occupied during peak parking hours (for instance, 80% of the legal spaces are occupied when the count is made), the neighborhood can be designated an RPP area.

In some jurisdictions (Baltimore, Chicago), the enabling legislation gives a city department or agency the authority to designate an RPP neighborhood. Other cities, such as Washington, D.C., require action by the city council before approval is granted.

In most cities, the traffic department or DOT is the agency most likely to be responsible for planning the RPP program. Community groups and the police department are also frequently involved in program planning.

In most programs, residents purchase a residential parking permit which they affix to one of the windows of their vehicle. Cars displaying this permit may park for any period of time on a street designated as part of an RPP area; those vehicles which do not display a permit are restricted from parking in an RPP designated area beyond a short period of time, generally two hours, during certain hours of the day. The parking permits are issued by a variety of city agencies and departments including the DOT, police, public works, finance, and the city manager's office. In all but one of the cities iden-

tified that have programs in place, the permit is valid for one year. The price of the permit typically ranges from \$5 to \$10 a year to cover the cost of program implementation.

RPP programs vary from one jurisdiction to the next with respect to size, locale, and community objectives. In Washington, D.C., the program now encompasses 1,400 blockfaces in more than a dozen neighborhoods throughout the city. Other cities have implemented the program on a much smaller scale, sometimes in only one neighborhood that is adversely impacted by nonresident parking.



Vehicle displaying residential parking permit.

The areas most frequently included in an RPP program are downtown residential neighborhoods in close proximity to the central business district. However, non-CBD residential neighborhoods that are adjacent to other major traffic generators have also found an RPP program to be helpful. Examples of such traffic generators are:

- hospitals.
- sports stadiums.
- university facilities.
- transit stops.
- retail centers.
- office complexes.

RPP programs can relieve congestion and reduce parking problems at the micro or neighborhood level and are effective in neighborhoods adversely impacted by nonresident parking, irrespective of the size of the jurisdiction. The reasons most frequently cited for implementing these programs were improving the neighborhood environment and discouraging commuter parking. In virtually all of the jurisdictions that have RPP programs in effect, these objectives have been achieved.

Several lessons regarding implementation of an RPP program have emerged from the experience to date:

- Involving citizens in the planning process is essential. Because an RPP program generally requires residents to purchase a parking sticker or decal and because the program's impact on the neighborhood is more serious than traditional parking measures, the neighborhood should be fully informed regarding all aspects of the program and should be encouraged to participate in program planning. Accordingly, many jurisdictions *require that a neighborhood initiate the request*

for an RPP designation as the first step in the process.

- Enforcement is also an important key to the success of an RPP program. Lax enforcement of the parking regulations in an RPP area will doom the program from the outset. Therefore, securing the cooperation of the enforcement agency, typically the police or traffic department, *prior* to program implementation is essential.
- The size of an RPP area can significantly affect its impacts. If the RPP area is small (for example, four blockfaces or less), the displaced parkers will probably move to nearby blocks beyond the boundaries of the RPP. However, if the area covered is extensive, these persons either will have to park at a considerable distance and walk to their destination, switch to a different transportation mode, or perhaps not make the trip at all.

With respect to the last point, an RPP program may have consequences that extend far beyond the boundaries of a particular designated neighborhood. If, for example, commuters to the CBD can no longer park in adjoining neighborhoods, they may choose to pay for parking, carpool or vanpool, or use public transit. If their numbers are significant and transit capacity at peak hours is not adequate to accommodate the increase, severe overcrowding may result.

Thus, while an RPP program is first and foremost designed to improve the environment of a particular neighborhood, it may have consequences that go beyond that neighborhood and therefore must be understood in the context of its effect on the overall transportation system.

LYNCHBURG: RESIDENTIAL PERMIT PARKING

Although Lynchburg, Virginia is a relatively small city (population 63,000), its residential parking permit program is fairly typical of RPP programs implemented throughout the country. Lynchburg has several colleges and hospitals located in residential neighborhoods that do not provide adequate on-site parking facilities. The resultant spillover of vehicles into the adjoining neighborhoods led to the development of an RPP program.

The objectives of Lynchburg's RPP program are to discourage nonresident parking and to improve the neighborhood environment. Although a city-wide ordinance exists permitting the use of RPPs, the program is implemented on a neighborhood-by-neighborhood basis and only after the following steps have been taken:

- 1) A neighborhood registers its complaint with the City traffic engineer.
- 2) The traffic engineer investigates the area to determine the legitimacy of the need.
- 3) The traffic engineer and a member of the Police Department meet with the affected residents to describe the program and its implications.
- 4) If the residents still feel there is a need for an RPP, 51% of the affected property owners must sign a petition supporting the request.
- 5) The traffic engineer then conducts a more detailed study of the parking conditions in the area, look-

ing particularly at the effects of excessive on-street parking on:

- child and residential safety
- air and noise pollution
- deterioration of the neighborhood's character.
- increased maintenance problems.
- threat to property values.

6) The traffic engineer submits his findings to the City Council.

7) The City Council holds a public hearing to determine whether the needs represented in the traffic engineer's study comply with the intent of the city ordinance.

8) If so, each resident receives a sticker and three visitors passes at a cost of \$2 a year. (Additional visitors passes may be issued on a temporary basis).

Service vehicles are exempt from ticketing if they are clearly marked, otherwise they must obtain a visitors pass from the resident whom they are serving. Residents wishing to hold a social event may obtain relaxed parking restrictions for their guests after notifying the Lynchburg Police Department two days in advance. There is a \$10 fine for violations of the RPP ordinance.

The program was initially opposed by the Police Department, which did not want to take on the additional enforcement responsibilities. This is no longer a problem. The annual cost of \$2,100, which includes administration and enforcement, is covered by the yearly revenue of \$3,000 from permits and tickets.

STRICT ENFORCEMENT PROGRAMS

A number of cities have instituted strict enforcement programs to reduce congestion and improve traffic flow, achieve greater utilization of the existing parking supply, and increase municipal revenue. Strict enforcement programs typically involve one or more of the following tactics: rigorous enforcement of on-street parking regulations, towing, and booting (attaching a metal clamp to a wheel thereby immobilizing the vehicle; the boot is only removed after all outstanding tickets have been paid).

This study identified only a handful of cities in which all three of these enforcement tactics have been implemented. Among them are Boston, Denver, Washington, D.C., Colorado Springs, and Billings, Montana.

By far the most commonly-employed tactic is the rigorous enforcement of parking regulations, a finding that is consistent with the fact that most of the strict enforcement programs are CBD-oriented and are aimed at achieving greater utilization of the parking inventory. Towing and booting programs are implemented less frequently. Fewer than one city in six considered putting a booting program into effect.

Two problems were noted in a number of jurisdictions regarding implementation of strict enforcement programs. One is the issue of police priorities and the utilization of police personnel. Parking enforcement is not perceived to be as important as other duties, such as the apprehension of criminals or the prevention of serious crime. One large midwestern city reported that "strict enforcement has been considered but it is difficult to get a commitment from the city police to implement such a program. Also, the traffic division is always the

first to be cut both in money and manpower." In another city, "personnel reductions in the police department have led to noticeably less ticketing."

One effective response to this program has been to shift the responsibility for the program from the police to the traffic department or the city DOT where non-police personnel are used for enforcement. Indeed, it is interesting to note that nearly two-thirds of the cities with programs in effect employ civilian parking control aides. The civilian aides are less expensive to employ and, unlike the police, have as their principal mission the enforcement of parking regulations. A few people have expressed the concern that if program responsibility for parking enforcement is shifted away from the police, they will completely abandon enforcement of any parking regulations, but this does not appear to be happening.

The second problem is the fear that implementation of a strict enforcement program will deter customers from entering the CBD to shop and/or carry out personal business. Several cities have received complaints from merchants that overly zealous enforcement of parking regulations has driven shoppers to suburban shopping malls. The reason most often cited for implementing strict enforcement programs, however, is to free parking spaces in the CBD for these very shoppers by reducing abuse of the short-term spaces and creating greater turnover. Thus, the success of a strict enforcement program will be measured, in part, by assessing the benefits derived from greater utilization of existing spaces and improved traffic flow against the costs of increased merchant displeasure and public an-

tagonism engendered by the stepped-up enforcement measures.

Another benefit of implementing a strict enforcement program, unrelated to its effect upon either traffic flow or parking availability, is the increase in revenue for the jurisdiction. Of the three strategies considered, booting is particularly effective in this respect because the owner of the booted vehicle must pay all outstanding parking fines before the boot is removed.

WASHINGTON, D.C.: STRICT ENFORCEMENT AN UNQUALIFIED SUCCESS

Washington, D.C. has, by all accounts, one of the most successful strict enforcement programs in the country. The program is under the authority of the City's Department of Transportation and includes aggressive ticketing, towing, booting, and administrative, rather than judicial, adjudication of parking and traffic cases.

The City employs 50 civilian parking control aides who each write, on the average, more than 100 tickets a day. The stepped-up ticketing has resulted in far fewer illegally-parked cars in the CBD, greater turnover at metered spaces, less travel congestion in the CBD, and improved bus travel times during peak hours. Parking meter revenue also has increased dramatically as well as revenue from fines.

Towing is contracted out to a private firm although DC DOT personnel are responsible for dispatching and for staffing the impoundment lots. In a typical case, a parking control aide identifies a vehicle to be towed and notifies the dispatcher by walkie-talkie. The dispatcher summons the nearest tow truck to remove the vehicle. The vehicle's owner must pay a \$50 towing fee plus any outstanding tickets before the car is released. Currently, approximately 200 vehicles a day are being towed.

Booting is the third element in Washington's strict enforcement program. Booting is only used when a vehicle's owner has four or more outstanding tickets and when immobilizing the vehicle does not constitute a safety hazard or impede traffic flow. DC DOT's 10 two-man civilian boot crews are furnished with lists of scofflaws that indicate the area where the scofflaw has been ticketed, the time of day, and the nature of the violations. More than 100 vehicles a day are booted; all unpaid tickets plus the \$25 booting fee must be paid before the boot will be removed.

In FY 1980, Washington's strict enforcement program grossed more than \$20 million. Operating costs totalled \$5.4 million, for a net income of approximately \$15 million.



The owner of this vehicle will have to pay all outstanding tickets before the boot is removed.



Having been dispatched by D.C. Department of Transportation personnel, tow truck operator prepares to remove illegally parked vehicle.

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